CLAIMS

What is claimed is:

1. A tool for transferring coil windings to a motor stator, comprising:

a first coil support portion configured to maintain a first bundle of coiled wire at a first height for insertion into a first set of motor stator slots; and

a second coil support portion configured to maintain a second bundle of coiled wire at a second height above the first height for insertion into a second set of motor stator slots adjacent to the first set of slots; and

a least one partition member disposed between the first and second coil support portions.

2. The tool as recited in claim 1, wherein the coil support portions and partition member are configured to maintain each bundle of coiled wire in an vertical configuration such that the cross section of the bundle of coiled wire has a greater height than width as determined with respect to the corresponding support portion.

3. The tool as recited in claim 1, comprising a third coil support portion configured to maintain a third bundle of coiled wire at a third height above the second height for insertion into a third set of motor stator slots adjacent to at least one of the first and second set of slots.

4. The tool as recited in claim 1, wherein the coil support portions comprise a plastic material.

5. The tool as recited in claim 1, wherein the coil support portions include arcuate surface.

6. The tool as recited in claim 1, wherein the at least one partition member comprises a plurality of spear-tipped members.

7. A form assembly for coiling wire, comprising:

a winding assembly including first and second wire guides each having a plurality of channels for receiving bundles of wire, the channels being configured to arrange the bundles of wire in each wire guide in a stepped configuration with respect to one another, and a frame assembly configured to couple the first and second wire guides; and

a transfer tool selectively couplable to the winding assembly between the first and second wire guides, wherein the transfer tool is configured to maintain the stepped configuration of the bundles of wire upon removal of the bundles of wire from the wire guides.

8. The form assembly as recited in claim 7, wherein the frame assembly is configured to selectably adjust the distance between the first and second wire guides.

9. The form assembly as recited in claim 7, wherein the transfer tool comprises a first and second coil support portions respectively configured to maintain a first bundle of wire at a first height and a second bundle of wire at a second height in accordance with the stepped configuration.

10. The form assembly as recited in claim 9, wherein the transfer tool is configured to maintain each of the first and second bundles of wire in a vertical configuration upon decoupling of the transfer tool from the winding assembly such that each bundle of wire has a greater cross section height than width as determined with respect to the corresponding coil support portions.

11. The form assembly as recited in claim 9, wherein the coil support portions comprise arcuate surfaces.

12. The form assembly as recited in claim 7, comprising a latching mechanism configured to selectably secure the transfer tool to the winding assembly.

13. The form assembly as recited in claim 7, wherein at least one of the first and second wire guides comprises a receiving portion configured to receive the transfer tool at a predetermined distance between the first and second wire guides.

14. The form assembly as recited in claim 7, wherein the winding assembly is couplable to a rotating member.

15. A wire form assembly configured to coil a wire for insertion in a motor stator having a plurality of stator slots, each stator slot having a slot profile defined by a cross section of the slot perpendicular to the longitudinal axis of the stator, comprising:

a winding assembly including first and second wire guides having a plurality of channels for receiving bundles of wire, the channels being configured to arrange the bundles

of wire in each wire guide in a stepped configuration with respect to one another and in a vertical configuration such that the orientation of the bundle of wire corresponds to the stator slot profile for insertion of the bundle of wire into the stator slot; and

a transfer tool selectively couplable to the winding assembly between the first and second wire guides, wherein the transfer tool is configured to maintain the bundles of wire in the stepped configuration and the vertical configuration upon removal of the bundles of wire from the wire guides.

16. The wire form assembly as recited in claim 15, wherein the transfer tool comprises a plurality of coil support portions configured to maintain the bundles of wire in the stepped configuration upon removal of the bundles of wire from the wire guides.

17. The wire form assembly as recited in claim 16, wherein the coil support portions comprise arcuate surfaces.

18. The wire form assembly as recited in claim 16, wherein the transfer tool comprises a plurality of partition portions configured to maintain the bundles of wire in the vertical configuration in cooperation with the coil support portions.

19. The wire form assembly as recited in claim 15, wherein the winding assembly is couplable to a rotating member.

20. A winding form assembly for coiling wire for insertion into a motor stator, comprising:

a winding assembly including first and second wire guides having a plurality of channels for receiving bundles of coiled wire, the channels being configured to arrange the bundles of coiled wire in each wire guide in a stepped configuration with respect to one another, and a frame assembly configured to couple the first and second wire guides; and

a transfer tool selectively couplable to the winding assembly between the first and second wire guides, comprising a first coil support portion configured to maintain a first bundle of coiled wire at a first height for insertion into a first set of motor stator slots, a second coil support portion configured to maintain a second bundle of coiled wire at a second height above the first height for insertion into a second set of motor stator slots adjacent to the first set of slots, and a least one partition members disposed between the first and second coil support portions to maintain the stepped configuration upon removal of the bundles of wire from the wire guides.

21. The winding form assembly as recited in claim 20, wherein at least one of the coil support portions includes an arcuate surface.

22. The winding form assembly as recited in claim 20, wherein the channels are defined by a plurality of wall portions and a base portion, and wherein the channels are configured to arrange the bundles of coiled wire located respectively therein in a vertical configuration such that the cross section of each bundle of coiled wire has a greater height than width as determined with respect to the base portion.

23. The winding form assembly as recited in claim 20, wherein the coil support portions and the at least one partition member are configured to maintain the vertical configuration of the bundles of coiled wire upon removal of the bundles of coiled wire from the wire guides.

24. A method of forming coiled bundles of wire for insertion into a motor stator, comprising:

feeding wire into first and second wire guides having a plurality of channels for receiving bundles of wire to form coiled bundles of wire, each channel being defined by a plurality of walls and a base portion;

arranging the coiled bundles of wire in each wire guide in a stepped configuration with respect to one other via the channels; and

removing the coiled bundles of wire from the wire guides via a transfer tool such that the stepped configuration of the coiled bundles of wire is maintained.

25. The method as recited in claim 24, comprising rotating the wire guides about a center point.

26. The method as recited in claim 24, comprising arranging the coiled bundles of wire in each channel in a vertical configuration such that the cross section of each coiled bundle of wire has a greater height than width as determined with respect to the base portion for insertion of the coiled bundles of wire into slots located in the motor stator.

27. The method as recited in claim 26, comprising removing the coiled bundles of wire from the wire guides via a transfer tool such that the vertical configuration of the coiled bundles of wire is maintained.

28. The method as recited in claim 24, comprising collapsing the wire guides towards one another thereby engaging the transfer tool with at least one of the coiled bundles of wire.

29. A method of transferring a coiled bundle of wire from a winding form to a motor stator having a plurality of slots, each slot having a slot profile aspect ratio, comprising:

locating a transfer tool between a pair of wire guides having a plurality of concentrically arranged bundles of coiled wire arranged in each wire guide in a stepped configuration with respect to one another;

engaging a transfer tool with at least one of the bundles of coiled wire; and

removing the bundles of coiled wire from the wire guides via the transfer tool such that the stepped configuration of the bundles of coiled wire is maintained.

30. The method as recited in claim 29, comprising locating the transfer tool between wire guides having bundles of coiled wire arranged in a vertical configuration having a cross section aspect ratio in accordance with the slot profile aspect ratio.

31. The method as recited in claim 30, comprising removing the bundles of coiled wire from the wire guides via a transfer tool such that the vertical configuration of the bundles of coiled wire is maintained.

32. A method of forming a motor stator having bundles of coiled wire disposed in a plurality of concentrically arranged slots, comprising:

winding wire into bundles of coiled wire via first and second wire guides having a plurality of channels defined by a plurality of wall portions and a base portion,

arranging the bundles of coiled wire in a stepped configuration with respect to one another via the wire guides;

arranging each bundle of coiled wire in a vertical configuration via the channels such that the cross section of each bundle of coiled wire has a greater height than width as determined with respect to the base portion;

removing the bundles of coiled wire from the wire guides via the transfer tool, wherein the bundles of coiled wire retain the vertical and stepped configurations upon separation from the wire guide; and

inserting the bundles of coiled wire into the slots.

33. The method as recited in claim 32, comprising inserting the bundles of coiled wire into adjacently located slots.

34. The method as recited in claim 32, comprising collapsing the distance between the wire guides.

35. The method as recited in claim 32, comprising securing the vertical configuration of each bundle of coiled wire.

36. The method as recited in claim 32, comprising nesting a collection of bundles of coiled wire located in adjacent slots with respect to one another.

37. The method as recited in claim 32, comprising binding the collection of bundles of coiled wire to form a coil end for the motor.

38. A tool for transferring coil windings to a motor stator from a winding assembly comprising:

first and second coil support portions each for supporting first and second bundles of coiled wire; and

at least one partition member disposed between the first and second coil support portions, wherein the at least one partition member and the coil support portions are configured to maintain a cross sectional aspect ratio of the first and second bundles having a width less than height upon separation of the bundles from the winding assembly.

39. The tool as recited in claim 38, wherein the first coil support portion is configured to maintain the first bundle at a first height, and the second coil support portion is configured to maintain the second bundle at a second height such that the first height is less than the second height.

40. A form assembly for coiling wire, comprising:

a winding assembly including first and second wire guides each having a plurality of channels for receiving bundles of wire, the channels being configured to arrange the bundles of wire in each wire guide in a vertical configuration such that the cross sectional aspect ratio of each bundle of wire has a width less than height; and

a transfer tool selectively couplable to the winding assembly between the first and second wire guides, wherein the transfer tool is configured to maintain the vertical configuration of the bundles of wire upon removal of the bundles of wire from the wire guides.

41. The form assembly as recited in claim 40, the channels are configured to arrange the bundles of wire in each wire guide in a stepped configuration with respect to one another, and wherein the transfer tool is configured to maintain the stepped configuration of the bundles of wire upon removal of the bundles of wire from the wire guides.